Australian contribution to ILWS

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Summary of Australian Interests

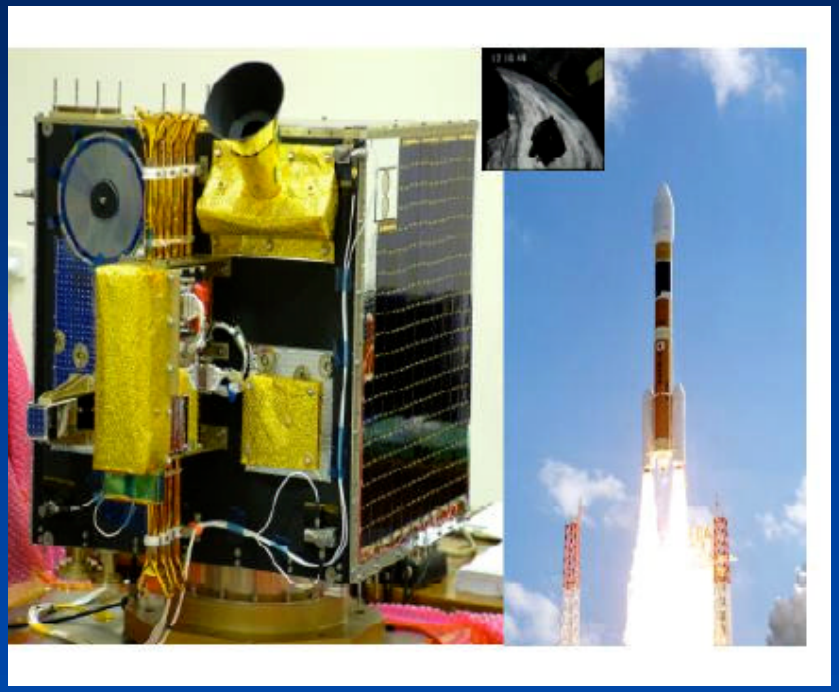
- Space weather and service delivery
- Space weather monitoring in real-time
- Realistic models of magnetosphere, ionosphere and solar wind phenomena
- Recognition of imminent solar/IP activity
- Solar magnetic structures & reconnection
- CMEs, flares, and related emissions

Australian Contributions

- Solar and interplanetary
- Magnetospheric
- Ionospheric
- Space weather prediction
- Southern hemisphere sites for satellite data downloads or ground-based monitoring

Some Australian Space Instuments

Antarctica



FedSat – only spacecraft

Culgoora

TIGER
radar

Space Science Decadal Plan 2007-2016 Themes

- **Sun and Space to Earth**
- **Plasma to Planets**
- **Observing Australia, Earth and Planets**
- **Life and Technology in Space**

- **New Australian Instruments and Space Missions**
- **Theory, Modelling & Data Provision/Storage**

Space Science Decadal Plan
Government and Public

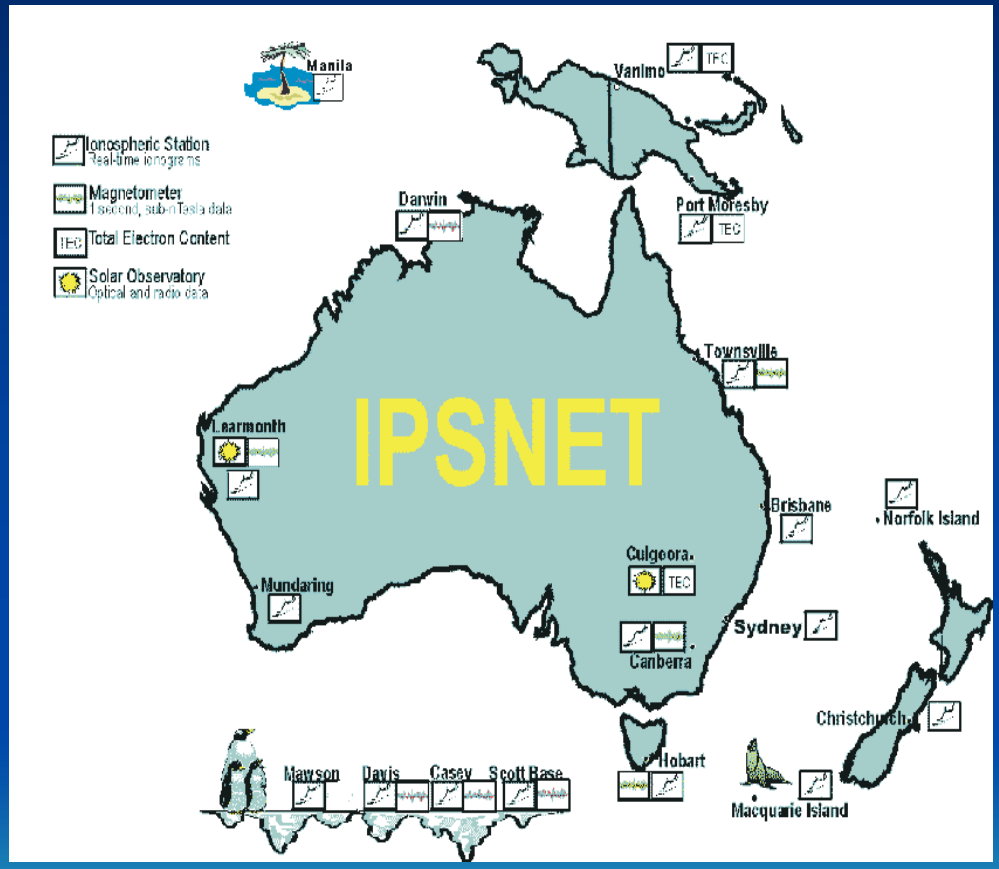
- **Demographics Working Group**
- **Government Working Group**
- **Public Outreach Working Group**

Australian Space Weather Plan

- **Space weather monitoring & services**
  - **Establishment of space weather agency**
- **Space weather research priorities**
  - **Research community to agree priorities**
- **Community outreach**
  - **Education and enhancement of infrastructure design and planning**

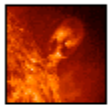
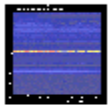
Aust Monitoring network

- Network of sites
  - Australian mainland
  - Antarctic Territory
  - PNG and Pacific (Norfolk Is., and Niue)
  - New Zealand
- Low-High latitudes
- 150E long. chain
- Area covered (110E-170W, 0-70S geog.)



IPS Space Weather Status Panel

Solar Conditions

Solar Wind Speed	X-Ray Flux	X-Ray Flares	Latest Culgoora Spectrograph	Latest Culgoora H-Alpha Image
	C1.4			

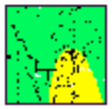
Geophysical Conditions

Geomagnetic Warning	K-Index	*pc*3 Index	GEOSTAT Alert	Geomagnetic Alert	Aurora Alert
No Warning	2	1	No Alert	No Alert	No Alert

HF Propagation Conditions

HF Comm. Warning	Current HF Fadeout	HF Fadeout Warning	Polar Cap Absorption
No Event	No Event	No Event	0.7dB AT 05:39 UT

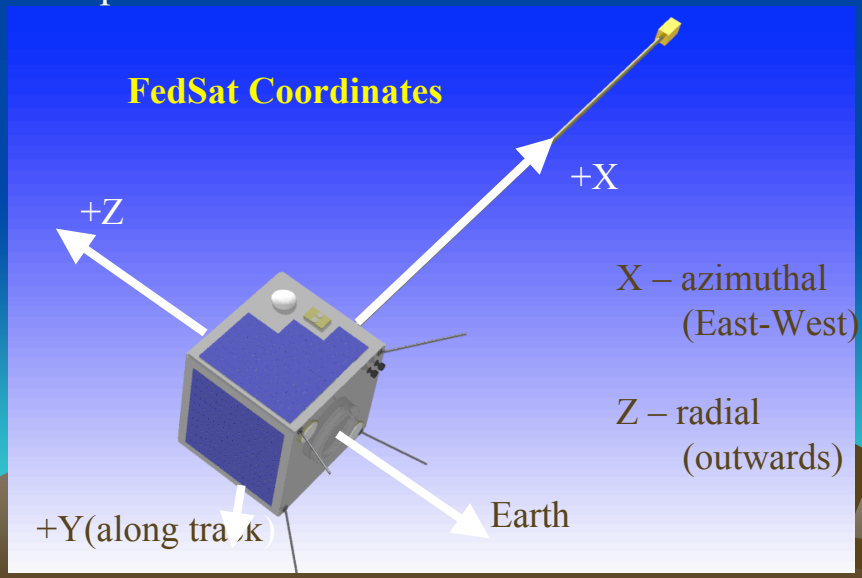
Ionospheric Conditions

Australasia	North America	Europe
		

Fedsat – An Australian Research Satellite

- Australia's first satellite in 35 years
- Built by Cooperative Research Centre for Satellite Systems (CRCSS)
- 58kg micro satellite (approx 50cm cube), three-axis stabilised and with 2.5m deployable boom
- Scientific and communications experiments
- Launched by NASDA in H-IIA rocket in December 2002
- In a low Earth circular polar orbit, sun synchronous at 10:30 LT, an inclination of 98.7° and a period of ~101 min

Above: Launch of the NASDA H-IIA rocket carrying Fedsat into orbit, 14 December, 2002.

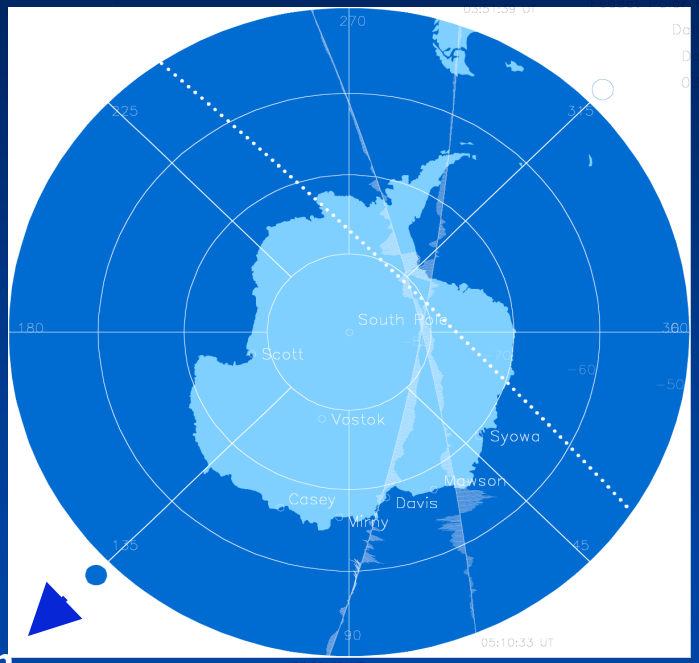


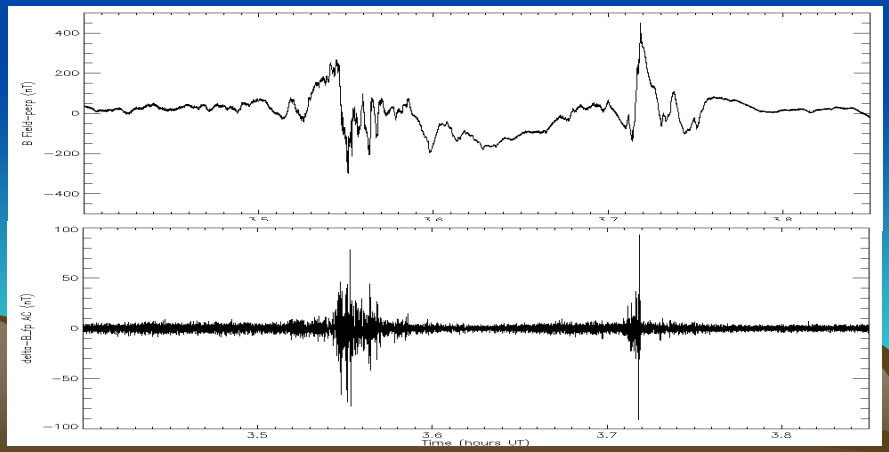
Newmag magnetometer payload

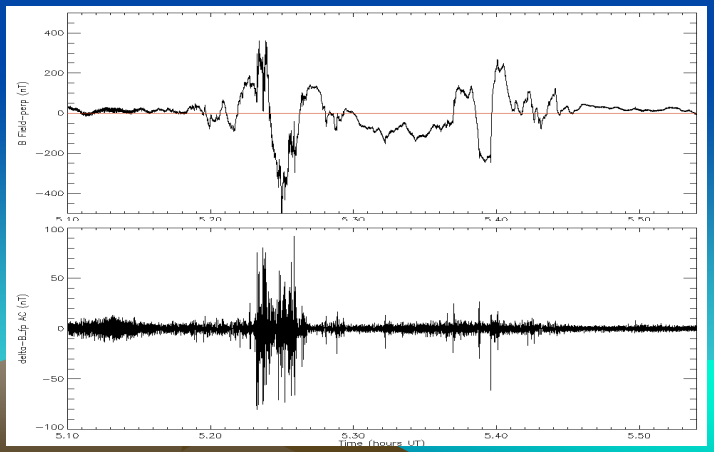
- Triaxial fluxgate magnetometer
- Built in collaboration with IGPP/UCLA
- Mounted on 2.5m boom to minimise interference from the spacecraft platform and other payloads
- Burst mode sampling rate of 100 vector samples/second (nominally 10VS/s)

Newmag – 100Hz triaxial fluxgate magnetometer

Fedsat South
polar pass
0320 - 0535 UT
15 October 2003





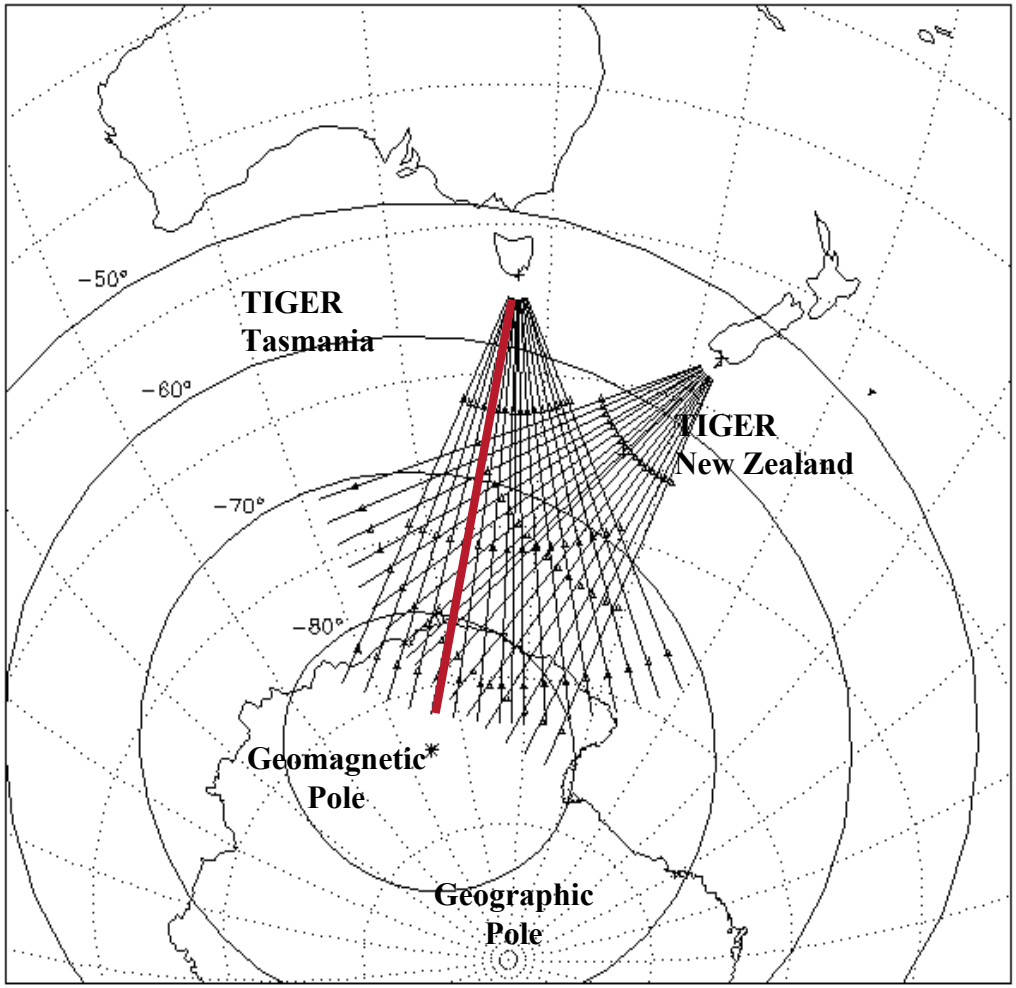


TIGER

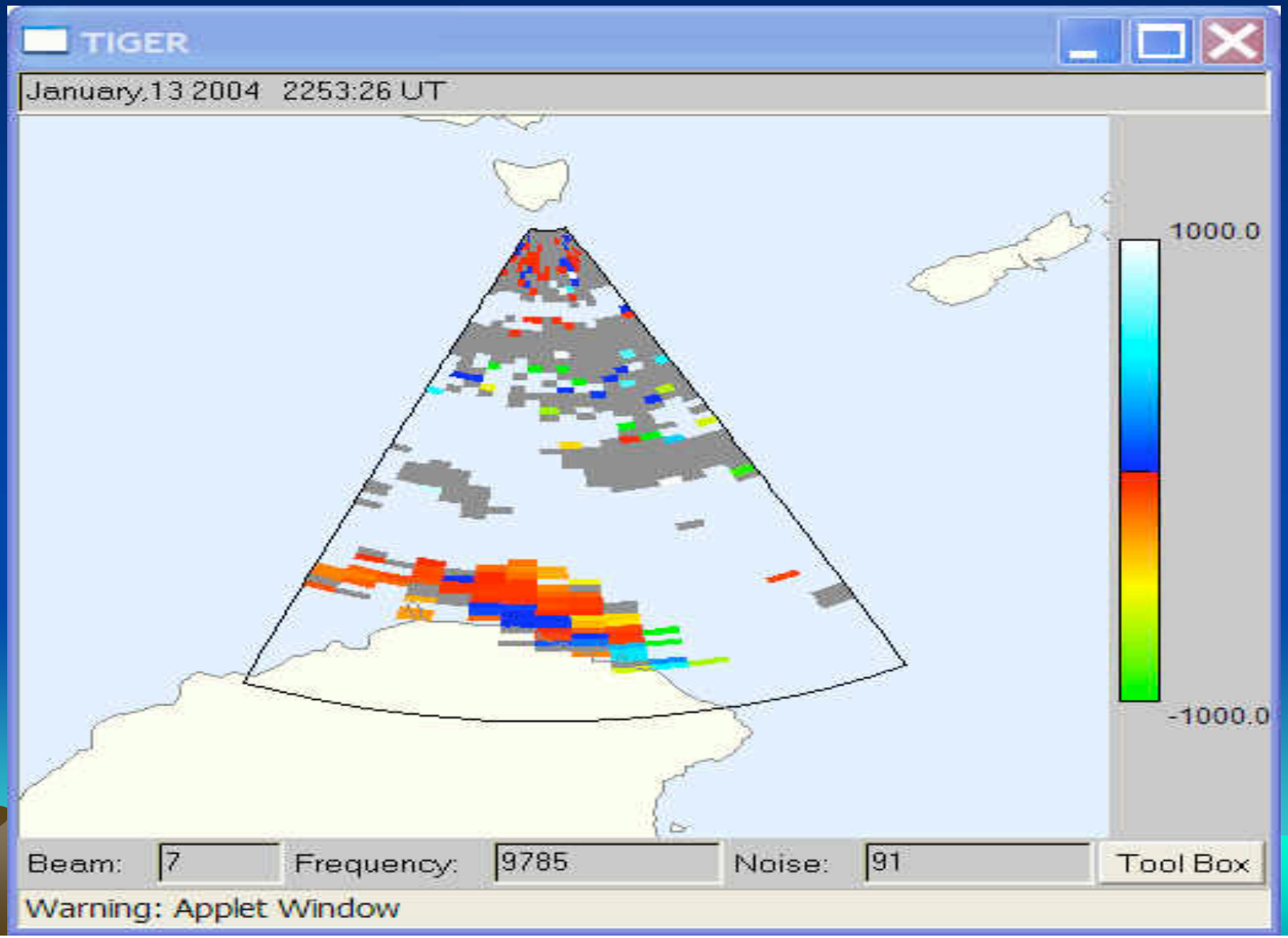
TIGER
(Tasman International Geospace Environment Radar)

Concept:
2 radars with intersecting beams.

Advantages:
- **Lower latitude coverage than other SuperDARN radars**
- **Provides essential longitude coverage for mapping convection in Southern Hemisphere**



TIGER Real-time snapshot



COSRAY Program

Equipment

- Multi-directional surface and underground muon telescopes (Mawson, 73 S mag and Hobart, 51.6^{o} S mag)
- Collaborative array with Japan, Brazil, Germany monitoring space environment variations

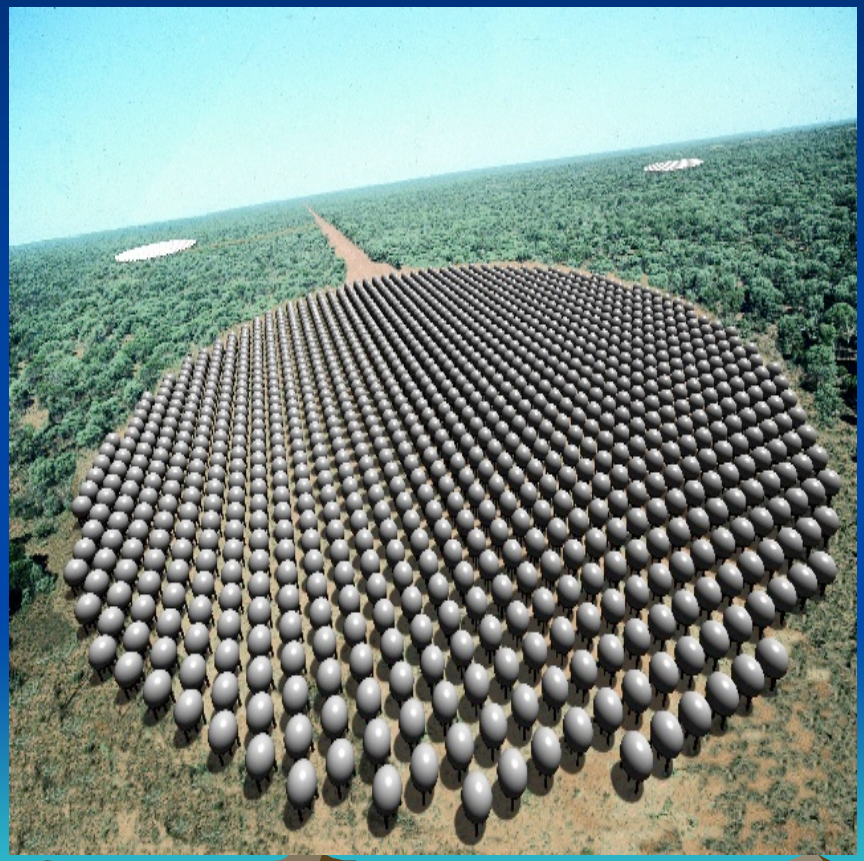
Scientific Program

- Magnetic storm precursor identification
- CME shock strength and geometry via collaborating high and low energy monitor arrays

Earth Station Downlink Availability

- Aust. Remote Sensing Centre (ACRES) Alice Springs (9m X/S-, 5m X-band dishes)
- TERSS (9m X-band Landsat 7) Hobart
- FEDSAT, Adelaide (3m Ka-band dish)

Monitoring antenna arrays



- Radioastronomy arrays in HF-VHF (MWA/LFD) and higher frequencies (Square kilometre array) show possible options for monitoring

WDC for Solar-Terrestrial Science

- Solar data (real-time radio spectrograph, optical patrol images)
- Ionospheric data (real-time VI ionosonde data)
- Ground geomagnetic data (real-time variometer)
- Magnetospheric (Fedsat) 3-component magnetometer
- Cosray data
- High latitude data (south polar latitudes, auroral radar)
- Low latitude data

Scientific Programs

- Ionospheric prediction
- Magnetospheric modelling
- Polar/Auroral current modelling
- CME and solar flare prediction
- Propagation through interplanetary space
- Far side solar holography
- Data fusion recognition of solar active regions

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